Apparent diffusion coefficient in metastases

High grade gliomas (HGGs) and brain metastases (BMs) can display similar imaging characteristics on conventional MRI. In HGGs, the peritumoral edema may be infiltrated by the malignant cells, which was not observed in BMs. Purpose To determine whether the apparent diffusion coefficient values could differentiate HGGs from BMs. Material and Methods Fifty-seven patients underwent conventional magnetic resonance imaging (MRI) and diffusion-weighted imaging (DWI) before treatment. The minimum and mean ADC in the enhancing tumor (ADCmin, ADCmean) and the minimum ADC in the peritumoral region (ADCedema) were measured from ADC maps. To determine whether there was a statistical difference between groups, ADC values were compared. A receiver operating characteristic (ROC) curve analysis was used to determine the cutoff ADC value for distinguishing between HGGs and BMs. Results The mean ADCmin values in the intratumoral regions of HGGs were significantly higher than those in BMs. No differences were observed between groups regarding ADCmean values. The mean ADCmin values in the peritumoral edema of HGGs were significantly lower than those in BMs. According to ROC curve analysis, a cutoff value of $1.332 \times 10-3$ mm2/s for the ADCedema generated the best combination of sensitivity (95%) and specificity (84%) for distinguishing between HGGs and BMs. The same value showed a sensitivity of 95.6% and a specificity of 100% for distinguishing between GBMs and BMs. Conclusion ADC values from DWI were found to distinguish between HGGs and solitary BMs. The peritumoral ADC values are better than the intratumoral ADC values in predicting the tumor type $^{1)}$.

1)

Caravan I, Ciortea CA, Contis A, Lebovici A. Diagnostic value of apparent diffusion coefficient in differentiating between high-grade gliomas and brain metastases. Acta Radiol. 2018 May;59(5):599-605. doi: 10.1177/0284185117727787. Epub 2017 Aug 23. PubMed PMID: 28835111.

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